UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/673,143	10/11/2000	Madeleine Prigent	Q60989	9530

7590 03/25/2004

Sughrue Mion Zinn Macpeak & Seas
2100 Pennsylvania Avenue NW Suite 800
Washington, DC 20037-3213

EXAMINER	
MAYO III, WILLIAM H	
ART UNIT	**PAPER NUMBER**
2831	

DATE MAILED: 03/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/673,143	PRIGENT ET AL.	
	Examiner	Art Unit	
	William H. Mayo III	2831	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 January 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hendewerk et al (Pat Num 6,270,856, herein referred to as Hendewerk) in view of Maxfield et al (Pat Num WO 93/04117, herein referred to as Maxfield). Hendewerk discloses power cable (Figs 3-4a & 4b) comprising at least one covering layer (Col 10, lines 63-68). Specifically, with respect to claim 1, Hendewerk discloses a power cable (Fig 3) comprising a conductive material

core (denoted as conductor) and at least one covering layer (denoted as inner and outer semiconductor shields and insulation) wherein the at least one covering layer (denoted as inner and outer semiconductor shields) may comprise an inorganic compound (i.e. carbon black & clay, Col 9, lines 39-52) of sheet structure (Fig 3) and an organic compound (i.e. polyethylene, denoted as insulation layer) inserted between the layers (inner and outer semiconductor layers) of inorganic compound (i.e. carbon black and clay, Col 10, lines 15-20), wherein the power cable (Fig 3) is a direct current cable having insulation coatings for medium and high direct current cable. With respect to claim 2, Hendewerk discloses inorganic compounds (i.e. carbon black & clay), which are inorganic oxides. With respect to claim 3, Hendewerk discloses that the inorganic oxide may be clay, such as kaolin (Col 9, lines 39-52). With respect to claim 5, Hendewerk discloses that the organic compound, may be polyethylene (Col 10, lines 15-20), which is a polymer. With respect to claim 6, Hendewerk discloses that the polymer may be selected from a group of polyolefin (i.e. polyethylene is a polyolefin). With respect to claim 8, Hendewerk discloses that the at least one covering layer (Fig 4a) comprises an insulative layer (denoted as insulation, Col 9, lines 39-52) that may comprise an inorganic compound (i.e. carbon black & clay) of sheet structure (Fig 4a) and an organic compound (polyethylene) inserted between the layers (semiconductive layers) of inorganic compound (i.e. carbon black & clay). With respect to claim 9, Hendewerk discloses that the at least one covering layer (Fig 3) comprises an jacket layer (i.e. external cover layer denoted as jacket, Col 9, lines 39-52) that may comprise

an inorganic compound (i.e. carbon black & clay) of sheet structure (Fig 4a) and an organic compound (polyethylene) inserted between the layers (semiconductive layers) of inorganic compound (i.e. carbon black & clay). With respect to claim 10, Hendewerk discloses that the at least one covering layer (Fig 4a) comprises an semiconductive screen (denoted as semiconductive layer, Col 10, lines 1-15) that may comprise an inorganic compound (i.e. carbon black & clay, Col 10, lines 20-25) of sheet structure (Fig 4a) and an organic compound (polyethylene) inserted between the layers (semiconductive layers) of inorganic compound (i.e. carbon black & clay). With respect to claim 11, Hendewerk discloses a method of fabricating a power cable (Fig 4a) including the steps providing the inorganic compound (i.e. carbon black & clay) and combining it with an organic compound (i.e. polyethylene), inserting the organic compound (i.e. polyethylene) between the layers (semiconductor layers) of containing the inorganic compounds (carbon black & clay) at a temperature higher than the temperature at which the organic compound (polyethylene) soften or melts (i.e. extrusion process, Col 10, lines 5-10) and obtaining a material (insulation layer) with an organic compound (i.e. polyethylene) between the semiconductive layers containing the inorganic compound (i.e. carbon black & clay). With respect to claim 15, Hendewerk discloses a method wherein the at least one covering layer (Fig 4a) comprises an semiconductive screen (denoted as semiconductive layer, Col 10, lines 1-15) that may comprise an inorganic compound (i.e. carbon black & clay, Col 10, lines 20-25) of sheet structure (Fig 4a) and an organic compound (polyethylene) inserted between the layers (semiconductive layers) of inorganic

compound (i.e. carbon black & clay). With respect to claim 17, Hendewerk discloses a method wherein the at least one covering layer (Fig 4a) comprises an insulative layer (denoted as insulation, Col 11, lines 10-13) that may comprise an inorganic compound (i.e. carbon black & clay) of sheet structure (Fig 4a) and an organic compound (polyethylene) inserted between the layers (semiconductive layers) of inorganic compound (i.e. carbon black & clay), which is surrounded by an external covering layer (denoted as semiconductive layer, Col 10, lines 1-15) that may comprise an inorganic compound (i.e. carbon black, Col 10, lines 20-25) of sheet structure (Fig 4a) and an organic compound (polyethylene) inserted between the layers (semiconductive layers) of inorganic compound (i.e. carbon black & clay).

However, Hendewerk doesn't necessarily disclose the inorganic compound being made from nanocomposite material (claims 1, 8, 9, 13), nor the inorganic compound being an inorganic oxide being clay chosen from montmorillonite or bentonite (claim 4), nor the polymer being selected from epoxy resin, polyester, polyamide, polyimide, polyetherimide, polyamide, polyurethane, silicone, or a mixture thereof (claim 7), nor the inorganic compound being a clay and said compatibilizing agent being selected from quaternary ammonium salt, an oxide of polyethylene, and a phosphorus containing derivative (claims 12 & 16), nor the material having a particle size equal to 1 nanometer (claim 14), nor the method of treating layers of inorganic compound with an agent to render it compatible with an organic compound while exfoliating the inorganic compound (claims 11, 15, & 17).

Maxfield teaches a polymeric nanocomposite composition that may be used as an molded article for electrical devices (Page 35, lines 31-35) and that exhibits improved properties over the monomer blending and polymerizing processes of the prior art (Page 3, lines 8-10), such as improved tensile yield strength, tensile modulus and/or ultimate elongation (Page 6, lines 1-4), greater mechanical reinforcement to polymer matrixes and imparts lower permeability to polymers (Pages 2-3, lines 37 & 17). Specifically, with respect to claim 1, Maxfield teaches that the flowable mixture comprising a polymer containing an inorganic material that has an inorganic compound being made from nanocomposite material (abstract). With respect to claim 4, Maxfield teaches that the inorganic compound may be an inorganic oxide such as montmorillonite clay (Page 10, lines 25-32). With respect to claim 7, Maxfield teaches that the organic material may be a polymer such as polyester, polyamide, polyetherimide, polyurethane (all cited on Page 26), and silicone, or a mixture thereof (cited on Page 27). With respect to claim 8, Maxfield teaches that the flowable mixture comprising a polymer containing an inorganic material that has an inorganic compound being made from nanocomposite material (abstract). With respect to claim 9, Maxfield teaches that the flowable mixture comprising a polymer containing an inorganic material that has an inorganic compound being made from nanocomposite material (abstract). With respect to claim 11, Maxfield teaches method of forming at least one layer comprising treating the layers of an inorganic compound, such as clay, with an agent (i.e. swelling/compatibilizing agents) to render the inorganic material compatible (Pages 1 & 2, lines 36-37 &

1-4), wherein an organic compound (i.e. polymer) is inserted between the inorganic materials at a temperature higher than the temperature at which the organic compound (i.e. polymer) softens or melts to exfoliate the inorganic compound (Pages 7-8, lines 31-36 & 1-2, respectively). With respect to claim 12, Maxfield teaches a method of fabricating the at least one conductive layer of the power cable, wherein the inorganic compound may be a clay and a compatibilizing agent being selected from quaternary ammonium complexes (i.e. salts, Page 39, lines 31). With respect to claim 13, Maxfield teaches a method of fabricating the at least one conductive layer of the power cable, wherein the flowable mixture comprising a polymer containing an inorganic material that has an inorganic compound being made from nanocomposite material (abstract). With respect to claim 14, Maxfield teaches a method of fabricating the at least one conductive layer of the power cable, wherein the organic material has a particle size that may be less than 50 A (i.e. less than 5 nanometers. With respect to claim 15, Maxfield teaches a method of fabricating the at least one conductive layer of the power cable, wherein the nanocomposite material comprises an exfoliated inorganic compound (Pages 7-8, lines 31-36 & 1-2, respectively). With respect to claim 16, Maxfield teaches a method of fabricating the at least one conductive layer of the power cable, wherein the inorganic compound may be clay and a compatibilizing agent being selected from quaternary ammonium complexes (i.e. salts, Page 39, lines 31). With respect to claim 17, Maxfield teaches a method of fabricating the at least one conductive

layer of the power cable, wherein the nanocomposite material comprises an exfoliated inorganic compound (Pages 7-8, lines 31-36 & 1-2, respectively).

With respect to claims 1, 4, 8-9, and 11 -17, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the inorganic polymeric composition of Hendewerk to comprise a nanocomposite in organic composition as taught by Maxfield because Maxfield teaches that such a inorganic polymeric nanocomposite composition that may be used as an molded article for electrical devices (Page 35, lines 31-35), exhibits improved properties over the monomer blending and polymerizing processes of the prior art (Page 3, lines 8-10), such as improved tensile yield strength, tensile modulus and/or ultimate elongation (Page 6, lines 1-4), greater mechanical reinforcement to polymer matrixes and imparts lower permeability to polymers (Pages 2-3, lines 37 & 1-7).

Response to Arguments

4. Applicant's arguments filed January 13, 2004 have been fully considered but they are not persuasive. The applicant argues the following:

A) There is no motivation or suggestion to utilize Maxfields's nano-composite composition as the semi-conductive layers of a medium to high voltage power cable because Maxfield doesn't suggest any application of the nano-composite composition in a medium or high voltage power cable.

B) The combination of Hendewerk and Maxfield doesn't not teach of suggest the claimed method of fabricating a medium voltage to high voltage power cable having a material with an organic compound inserted between the layers of an inorganic compound made of nanocomposite material.

With respect to arguments A & B, the examiner respectfully traverses. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Hendewerk discloses a composite coating comprising at least one covering layer (denoted as inner and outer semiconductor shields and insulation) wherein the at least one covering layer (denoted as inner and outer semiconductor shields) may comprise an inorganic compound (i.e. carbon black & clay, Col 9, lines 39-52) of sheet structure (Fig 3) and an organic compound (i.e. polyethylene, denoted as insulation layer) inserted between the layers (inner and outer semiconductor layers) of inorganic compound (i.e. carbon black and clay, Col 10, lines 15-20), wherein the power cable (Fig 3) is a direct current cable having insulation coatings for medium and high direct current cable. Hendewerk doesn't necessarily disclose the inorganic compound being made

from nanocomposite material (claims 1, 8, 9, 13). Maxfield teaches a polymeric nanocomposite composition that may be used as an molded article for electrical devices (Page 35, lines 31-35) and that exhibits improved properties over the monomer blending and polymerizing processes of the prior art, such as the Hendewerk composition (Page 3, lines 8-10), wherein the composition has improved tensile yield strength, tensile modulus and/or ultimate elongation (Page 6, lines 1-4), greater mechanical reinforcement to polymer matrixes and imparts lower permeability to polymers (Pages 2-3, lines 37 & 17). Clearly, while Maxfield doesn't specifically disclose a cable, the composition can be utilized in electrical products. A cable is an electrical product. Secondly, Maxfield discloses the same materials that Hendewerk discloses in the semi-conducting layers, however, Maxfield teaches an improved composition utilizing nano-components of the same inorganic compounds, which exhibit improved properties over the prior art compositions such as Hendewerk. Therefore, there clearly exist a motivation for combining the teaching of Hendewerk and Maxfield. Secondly, because Maxfield and Hendewerk both disclose the most of the same materials to form the composition, there clearly exist a reasonable amount of success. Thirdly, all of the claim elements are disclosed in the combination, as disclosed above with respect to the rejection under 35 USC 103(a). Therefore, a proper prima facie case of obviousness has been established and the rejection under 35 USC 103(a) is proper and just.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Communication

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to William H. Mayo III whose telephone number is (571)-272-1978. The examiner can normally be reached on M-F 8:30am-6:00 pm (alternate Fridays off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dean Reichard can be reached on (571) 272-2800 ext 31. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

William H. Mayo III
Primary Examiner
Art Unit 2831

WHM III